WHAT IS CLAIMED IS:

1. An image formation apparatus in which the discomfort index S of the sound obtained by the following tone quality evaluation equation (a) expressed in a regression equation, using regression coefficients of loudness value, sharpness value, tonality value and impulsiveness value of psychoacoustic parameters obtained from the operating noise at a position away from the end face of the image formation apparatus by a predetermined distance:

$$S = A \times (\text{loudness value}) + B \times (\text{sharpness value}) + C \times (\text{tonality value}) + D \times (\text{impulsiveness value}) + E$$

$$0.209 \leq A \leq 0.249$$

$$0.308 \leq B \leq 0.439$$

$$3.669 \leq C \leq 4.984$$

$$0.994 \leq D \leq 1.461$$

$$-4.280 \leq E \leq -3.274 \quad \ldots (a)$$

satisfies the condition of:

$$S \leq 0.6708 \times \text{Ln (ppm)} - 2.824$$

$$16 \leq \text{ppm} \leq 70 \quad \ldots (b).$$

2. The image formation apparatus according to claim 1, wherein the discomfort index S satisfies the condition of:

$$S \leq 0.5436 \times \text{Ln (ppm)} - 2.5795$$

$$16 \leq \text{ppm} \leq 70 \quad \ldots (d).$$

3. The image formation apparatus according to claim 2, wherein a high-frequency component reduction unit which reduces the high-frequency components is provided, in order to satisfy any of the conditions (b) and (d).

4. The image formation apparatus according to claim 3, wherein the high-frequency component reduction unit has a configuration for reducing the sliding noise of a recording medium in a paper feed transport unit.

5. The image formation apparatus according to claim 4, wherein the high-frequency component reduction unit is a guide member which guides the recording medium, the guide member is formed of a flexible sheet, and the end portion of the flexible sheet which is brought into contact with the recording medium is curved so as not to have an edge, or bent so as to be rounded.

6. The image formation apparatus according to claim 1, wherein a pure sound component reduction unit is provided, in order to satisfy the condition (b).

7. The image formation apparatus according to claim 6, wherein the pure sound component reduction unit has a configuration for reducing the charging noise generated when charging is performed by an alternating current bias with

respect to an image carrier.

8. The image formation apparatus according to claim 7, wherein the configuration for reducing the charging noise is a configuration for making the characteristic frequency of the image carrier a frequency different from a frequency obtained by multiplying the frequency f of the alternating current bias by a natural number.

9. The image formation apparatus according to claim 7, wherein the configuration for reducing the charging noise is one having a sound-absorbing member inside the image carrier.

10. The image formation apparatus according to claim 7, wherein the configuration for reducing the charging noise is one for performing damping processing to the image carrier.

11. The image formation apparatus according to claim 2, wherein an impulsive sound reduction unit for reducing the impulsive sound is provided in order to satisfy any one of the conditions (b) and (d).

12. The image formation apparatus according to claim 11, wherein the impulsive sound reduction unit comprises a paper feed transport control unit which controls the operation of

an electromagnetic clutch provided respectively in the paper feed transport passage having a plurality of paper feed stages such that an electromagnetic clutch on the upper stage than the paper feed stage to be used is operated.

13. An image formation apparatus in which the discomfort index S of sound obtained by the following tone quality evaluation equation (c) expressed in a regression equation, using regression coefficients of loudness value, sharpness value, tonality value and impulsiveness value of psychoacoustic parameters obtained from the operating noise at a position away from the end face of the image formation apparatus by a predetermined distance:

$$S = A \times (\text{loudness value}) + B \times (\text{sharpness value}) + C \times (\text{tonality value}) + D \times (\text{impulsiveness value}) + E$$

$$A = +0.229$$

$$B = +0.373$$

$$C = +4.327$$

$$D = +1.202$$

$$E = -3.767 \quad \ldots (c)$$

satisfies the condition of:

$$S \leq 0.6708 \times \mathrm{Ln}(\mathrm{ppm}) - 2.824$$

$$16 \leq \mathrm{ppm} \leq 70 \quad \ldots (b).$$

14. The image formation apparatus according to claim 13, wherein the discomfort index S satisfies the condition of:

$$S \leq 0.5436 \times \mathrm{Ln}(ppm) - 2.5795$$

$$16 \leq ppm \leq 70 \quad \ldots (d).$$

15. The image formation apparatus according to claim 14, wherein a high-frequency component reduction unit which reduces the high-frequency components is provided, in order to satisfy to satisfy any of the conditions (b) and (d).

16. The image formation apparatus according to claim 15, wherein the high-frequency component reduction unit has a configuration for reducing the sliding noise of a recording medium in a paper feed transport unit.

17. The image formation apparatus according to claim 16, wherein the high-frequency component reduction unit is a guide member which guides the recording medium, the guide member is formed of a flexible sheet, and the end portion of the flexible sheet which is brought into contact with the recording medium is curved so as not to have an edge, or bent so as to be rounded.

18. The image formation apparatus according to claim 13, wherein a pure sound component reduction unit is provided, in order to satisfy either one of the condition (b) and the

equation (c).

19. The image formation apparatus according to claim 18, wherein the pure sound component reduction unit has a configuration for reducing the charging noise generated when charging is performed by an alternating current bias with respect to an image carrier.

20. The image formation apparatus according to claim 19, wherein the configuration for reducing the charging noise is a configuration for making the characteristic frequency of the image carrier a frequency different from a frequency obtained by multiplying the frequency f of the alternating current bias by a natural number.

21. The image formation apparatus according to claim 19, wherein the configuration for reducing the charging noise is one having a sound-absorbing member inside the image carrier.

22. The image formation apparatus according to claim 19, wherein the configuration for reducing the charging noise is one for performing damping processing to the image carrier.

23. The image formation apparatus according to claim 14, wherein an impulsive sound reduction unit for reducing the impulsive sound is provided in order to satisfy any one of the conditions (b) and (d).

24. The image formation apparatus according to claim 23, wherein the impulsive sound reduction unit comprises a paper feed transport control unit which controls the operation of an electromagnetic clutch provided respectively in the paper feed transport passage having a plurality of paper feed stages such that an electromagnetic clutch on the upper stage than the paper feed stage to be used is operated.

25. An image formation apparatus in which, of the loudness value, the sharpness value, the tonality value, the impulsiveness value and the roughness value of the psychoacoustic parameters obtained from the operating noise at a position away from the end face of the image formation apparatus by a predetermined distance, the roughness value satisfies the condition of not larger than 2.20 (asper), and the discomfort index S of the sound obtained by the following tone quality evaluation equation (a) expressed in the regression equation, using the regression coefficients of loudness value, sharpness value, tonality value and impulsiveness value:

$$S = A \times (\text{loudness value}) + B \times (\text{sharpness value}) + C \times (\text{tonality value}) + D \times (\text{impulsiveness value}) + E$$

$$0.209 \leq A \leq 0.249$$

$$0.308 \leq B \leq 0.439$$

$$3.669 \leq C \leq 4.984$$

$$0.994 \leq D \leq 1.461$$

$$-4.280 \leq E \leq -3.274 \quad \ldots \text{(a)}$$

satisfies the condition of:

$$S \leq 0.6708 \times \text{Ln (ppm)} - 2.824$$

$$16 \leq \text{ppm} \leq 70 \quad \ldots \text{(b)}.$$

26. The image formation apparatus according to claim 25, wherein the discomfort index S satisfies the condition of:

$$S \leq 0.5436 \times \text{Ln (ppm)} - 2.5795$$

$$16 \leq \text{ppm} \leq 70 \quad \ldots \text{(d)}.$$

27. The image formation apparatus according to claim 26, wherein a high-frequency component reduction unit which reduces the high-frequency components is provided, in order to satisfy any of the conditions (b) and (d).

28. The image formation apparatus according to claim 27, wherein the high-frequency component reduction unit has a configuration for reducing the sliding noise of a recording medium in a paper feed transport unit.

29. The image formation apparatus according to claim 28, wherein the high-frequency component reduction unit is a guide member which guides the recording medium, the guide member is formed of a flexible sheet, and the end portion of the flexible sheet which is brought into contact with the recording medium is curved so as not to have an edge, or bent so as to be rounded.

30. The image formation apparatus according to claim 25, wherein a pure sound component reduction unit is provided, in order to satisfy the condition (b).

31. The image formation apparatus according to claim 30, wherein the pure sound component reduction unit has a configuration for reducing the charging noise generated when charging is performed by an alternating current bias with respect to an image carrier.

32. The image formation apparatus according to claim 31, wherein the configuration for reducing the charging noise is a configuration for making the characteristic frequency of the image carrier a frequency different from a frequency obtained by multiplying the frequency f of the alternating current bias by a natural number.

33. The image formation apparatus according to claim 31, wherein the configuration for reducing the charging noise is one having a sound-absorbing member inside the image carrier.

34. The image formation apparatus according to claim 31, wherein the configuration for reducing the charging noise is one for performing damping processing to the image carrier.

35. The image formation apparatus according to claim 26, wherein an impulsive sound reduction unit for reducing the impulsive sound is provided in order to satisfy any one of the conditions (b) and (d).

36. The image formation apparatus according to claim 35, wherein the impulsive sound reduction unit comprises a paper feed transport control unit which controls the operation of an electromagnetic clutch provided respectively in the paper feed transport passage having a plurality of paper feed stages such that an electromagnetic clutch on the upper stage than the paper feed stage to be used is operated.

37. An image formation apparatus in which, of the loudness value, the sharpness value, the tonality value, the impulsiveness value and the roughness value of the psychoacoustic parameters obtained from the operating noise

at a position away from the end face of the image formation apparatus by a predetermined distance, the roughness value satisfies the condition of not larger than 2.20 (asper), and the discomfort index S of sound obtained by the following tone quality evaluation equation (c) expressed in a regression equation, using the regression coefficients of loudness value, sharpness value, tonality value and impulsiveness value of psychoacoustic parameters:

$$S = A \times (\text{loudness value}) + B \times (\text{sharpness value}) + C \times (\text{tonality value}) + D \times (\text{impulsiveness value}) + E$$

$$A = +0.229$$

$$B = +0.373$$

$$C = +4.327$$

$$D = +1.202$$

$$E = -3.767 \quad \ldots (c)$$

satisfies the condition of:

$$S \leq 0.6708 \times \mathrm{Ln}(\mathrm{ppm}) - 2.824$$

$$16 \leq \mathrm{ppm} \leq 70 \quad \ldots (b).$$

38. The image formation apparatus according to claim 37, wherein the discomfort index S satisfies the condition of:

$$S \leq 0.5436 \times \mathrm{Ln}(\mathrm{ppm}) - 2.5795$$

$$16 \leq \mathrm{ppm} \leq 70 \quad \ldots (d).$$

39. The image formation apparatus according to claim 38, wherein a high-frequency component reduction unit which reduces the high-frequency components is provided, in order to satisfy any of the conditions (b) and (d).

40. The image formation apparatus according to claim 39, wherein the high-frequency component reduction unit has a configuration for reducing the sliding noise of a recording medium in a paper feed transport unit.

41. The image formation apparatus according to claim 40, wherein the high-frequency component reduction unit is a guide member which guides the recording medium, the guide member is formed of a flexible sheet, and the end portion of the flexible sheet which is brought into contact with the recording medium is curved so as not to have an edge, or bent so as to be rounded.

42. The image formation apparatus according to claim 37, wherein a pure sound component reduction unit is provided, in order to satisfy either one of the condition (b) and the equation (c).

43. The image formation apparatus according to claim 42, wherein the pure sound component reduction unit has a configuration for reducing the charging noise generated when

charging is performed by an alternating current bias with respect to an image carrier.

44. The image formation apparatus according to claim 43, wherein the configuration for reducing the charging noise is a configuration for making the characteristic frequency of the image carrier a frequency different from a frequency obtained by multiplying the frequency f of the alternating current bias by a natural number.

45. The image formation apparatus according to claim 43, wherein the configuration for reducing the charging noise is one having a sound-absorbing member inside the image carrier.

46. The image formation apparatus according to claim 43, wherein the configuration for reducing the charging noise is one for performing damping processing to the image carrier.

47. The image formation apparatus according to claim 38, wherein an impulsive sound reduction unit for reducing the impulsive sound is provided in order to satisfy any one of the conditions (b) and (d).

48. The image formation apparatus according to claim 47, wherein the impulsive sound reduction unit comprises a paper feed transport control unit which controls the operation of an electromagnetic clutch provided respectively in the paper feed transport passage having a plurality of paper feed stages such that an electromagnetic clutch on the upper stage than the paper feed stage to be used is operated.

49. An image formation apparatus in which, of the loudness value, the sharpness value, the tonality value, the impulsiveness value and the relative approach value of the psychoacoustic parameters obtained from the operating noise at a position away from the end face of the image formation apparatus by a predetermined distance, the relative approach value satisfies the condition of not larger than 2.21, and the discomfort index S of the sound obtained by the following tone quality evaluation equation (a) expressed in a regression equation, using the regression coefficients of loudness value, sharpness value, tonality value and impulsiveness value:

$$S = A \times (\text{loudness value}) + B \times (\text{sharpness value}) + C \times (\text{tonality value}) + D \times (\text{impulsiveness value}) + E$$

$$0.209 \leq A \leq 0.249$$

$$0.308 \leq B \leq 0.439$$

$$3.669 \leq C \leq 4.984$$

$$0.994 \leq D \leq 1.461$$

$$-4.280 \leq E \leq -3.274 \quad \ldots (a)$$

satisfies the condition of:

$$S \leq 0.6708 \times \mathrm{Ln}(\mathrm{ppm}) - 2.824$$

$$16 \leq \mathrm{ppm} \leq 70 \quad \ldots (b).$$

50. The image formation apparatus according to claim 49, wherein the discomfort index S satisfies the condition of:

$$S \leq 0.5436 \times \mathrm{Ln}(\mathrm{ppm}) - 2.5795$$

$$16 \leq \mathrm{ppm} \leq 70 \quad \ldots (d).$$

51. The image formation apparatus according to claim 50, wherein a high-frequency component reduction unit which reduces the high-frequency components is provided, in order to satisfy any of the conditions (b) and (d).

52. The image formation apparatus according to claim 51, wherein the high-frequency component reduction unit has a configuration for reducing the sliding noise of a recording medium in a paper feed transport unit.

53. The image formation apparatus according to claim 52, wherein the high-frequency component reduction unit is a guide member which guides the recording medium, the guide member is formed of a flexible sheet, and the end portion of the flexible sheet which is brought into contact with the recording medium

is curved so as not to have an edge, or bent so as to be rounded.

54. The image formation apparatus according to claim 49, wherein a pure sound component reduction unit is provided, in order to satisfy the condition (b).

55. The image formation apparatus according to claim 54, wherein the pure sound component reduction unit has a configuration for reducing the charging noise generated when charging is performed by an alternating current bias with respect to an image carrier.

56. The image formation apparatus according to claim 55, wherein the configuration for reducing the charging noise is a configuration for making the characteristic frequency of the image carrier a frequency different from a frequency obtained by multiplying the frequency f of the alternating current bias by a natural number.

57. The image formation apparatus according to claim 55, wherein the configuration for reducing the charging noise is one having a sound-absorbing member inside the image carrier.

58. The image formation apparatus according to claim 55, wherein the configuration for reducing the charging noise is one for performing damping processing to the image carrier.

59. The image formation apparatus according to claim 50, wherein an impulsive sound reduction unit for reducing the impulsive sound is provided in order to satisfy any one of the conditions (b) and (d).

60. The image formation apparatus according to claim 59, wherein the impulsive sound reduction unit comprises a paper feed transport control unit which controls the operation of an electromagnetic clutch provided respectively in the paper feed transport passage having a plurality of paper feed stages such that an electromagnetic clutch on the upper stage than the paper feed stage to be used is operated.

61. An image formation apparatus in which, of the loudness value, the sharpness value, the tonality value, the impulsiveness value and the relative approach value of the psychoacoustic parameters obtained from the operating noise at a position away from the end face of the image formation apparatus by a predetermined distance, the relative approach value satisfies the condition of not larger than 2.21, and the discomfort index S of sound obtained by the following tone

quality evaluation equation (c) expressed in a regression equation, using the regression coefficients of loudness value, sharpness value, tonality value and impulsiveness value of psychoacoustic parameters:

$$S = A \times (\text{loudness value}) + B \times (\text{sharpness value}) + C \times (\text{tonality value}) + D \times (\text{impulsiveness value}) + E$$

$$A = +0.229$$

$$B = +0.373$$

$$C = +4.327$$

$$D = +1.202$$

$$E = -3.767 \quad \ldots (c)$$

satisfies the condition of:

$$S \leq 0.6708 \times \mathrm{Ln}(\mathrm{ppm}) - 2.824$$

$$16 \leq \mathrm{ppm} \leq 70 \quad \ldots (b).$$

62. The image formation apparatus according to claim 61, wherein the discomfort index S satisfies the condition of:

$$S \leq 0.5436 \times \mathrm{Ln}(\mathrm{ppm}) - 2.5795$$

$$16 \leq \mathrm{ppm} \leq 70 \quad \ldots (d).$$

63. The image formation apparatus according to claim 62, wherein a high-frequency component reduction unit which reduces the high-frequency components is provided, in order to satisfy any of the conditions (b) and (d).

64. The image formation apparatus according to claim 63, wherein the high-frequency component reduction unit has a configuration for reducing the sliding noise of a recording medium in a paper feed transport unit.

65. The image formation apparatus according to claim 64, wherein the high-frequency component reduction unit is a guide member which guides the recording medium, the guide member is formed of a flexible sheet, and the end portion of the flexible sheet which is brought into contact with the recording medium is curved so as not to have an edge, or bent so as to be rounded.

66. The image formation apparatus according to claim 61, wherein a pure sound component reduction unit is provided, in order to satisfy either one of the condition (b) and the equation (c).

67. The image formation apparatus according to claim 66, wherein the pure sound component reduction unit has a configuration for reducing the charging noise generated when charging is performed by an alternating current bias with respect to an image carrier.

68. The image formation apparatus according to claim 66, wherein the configuration for reducing the charging noise is a configuration for making the characteristic frequency of the image carrier a frequency different from a frequency obtained by multiplying the frequency f of the alternating current bias by a natural number.

69. The image formation apparatus according to claim 67, wherein the configuration for reducing the charging noise is one having a sound-absorbing member inside the image carrier.

70. The image formation apparatus according to claim 67, wherein the configuration for reducing the charging noise is one for performing damping processing to the image carrier.

71. The image formation apparatus according to claim 62, wherein an impulsive sound reduction unit for reducing the impulsive sound is provided in order to satisfy any one of the conditions (b) and (d).

72. The image formation apparatus according to claim 71, wherein the impulsive sound reduction unit comprises a paper feed transport control unit which controls the operation of an electromagnetic clutch provided respectively in the paper feed transport passage having a plurality of paper feed stages

such that an electromagnetic clutch on the upper stage than the paper feed stage to be used is operated.

73. An image formation apparatus in which the discomfort index S of the sound obtained by the following tone quality evaluation equation (e) expressed in a regression equation, using the regression coefficients of sound pressure level, and loudness value, sharpness value, tonality value and impulsiveness value of the psychoacoustic parameters obtained from the operating noise at a position away from the end face of the image formation apparatus by a predetermined distance, and ppm (number of printed sheets of paper per minute of A4 lateral size; also referred to as cpm) value:

$$S = G \times (\text{sound pressure level}) + A \times (\text{loudness value}) + B \times (\text{sharpness value}) + C \times (\text{tonality value}) + D \times (\text{impulsiveness value}) + F \times (\text{ppm value}) + E$$

$$0.0442 \leq G \leq 0.0830$$

$$0.0678 \leq A \leq 0.1677$$

$$0.3629 \leq B \leq 0.5084$$

$$2.5473 \leq C \leq 4.0677$$

$$-0.0533 \leq D \leq 0.3279$$

$$-0.0058 \leq F \leq 0.0006$$

$$-3.7769 \leq E \leq 7.6274 \quad \ldots (e)$$

satisfies the condition of:

$$S \leq 0.5432 \times \text{Ln (ppm)} - 2.3398$$

$16 \leq ppm \leq 70$ ... (f).

74. The image formation apparatus according to claim 73, wherein the discomfort index S satisfies the condition of:

$S \leq 0.416 \text{ Ln } (ppm) - 2.0952$ ... (h)

$16 \leq ppm \leq 70$

75. The image formation apparatus according to claim 73, wherein with respect to the noise emitted from the image formation apparatus, the discomfort index S of noise in the direction of the operating section at a distance of 1.00m ± 0.03mm from the end face of the image formation apparatus, and at a height of 1.50 ± 0.03m above the floor level or at a height of 1.20 ± 0.03m above the floor level, is within the tolerance.

76. The image formation apparatus according to claim 73, wherein with respect to the noise emitted from the image formation apparatus, the discomfort index S calculated from a mean value of physical quantity of noise in four directions of front and back, and right and left, at a distance of 1.00m ± 0.03mm from the end face of the image formation apparatus, and at a height of 1.50 ± 0.03m above the floor level or at a height of 1.20 ± 0.03m above the floor level, is within the tolerance.

77. The image formation apparatus according to claim 73, wherein with respect to the noise emitted from the image formation apparatus, the discomfort index S of at least one side, at a distance of 1.00m ± 0.03mm from the end face of the image formation apparatus, and at a height of 1.50 ± 0.03m above the floor level or at a height of 1.20 ± 0.03m above the floor level, is within the tolerance.

78. The image formation apparatus according to claim 73, wherein with respect to the noise emitted from the image formation apparatus, the discomfort index S of noise of all the four sides, at a distance of 1.00m ± 0.03mm from the end face of the image formation apparatus, and at a height of 1.50 ± 0.03m above the floor level or at a height of 1.20 ± 0.03m above the floor level, is within the tolerance.

79. The image formation apparatus according to claim 74, wherein a high-frequency component reduction unit which reduces the high-frequency components is provided, in order to satisfy any of the conditions (f) and (h).

80. The image formation apparatus according to claim 79, wherein the high-frequency component reduction unit has a configuration for reducing the sliding noise of a recording medium in a paper feed transport unit.

81. The image formation apparatus according to claim 80, wherein the high-frequency component reduction unit is a guide member which guides the recording medium, the guide member is formed of a flexible sheet, and the end portion of the flexible sheet which is brought into contact with the recording medium is curved so as not to have an edge, or bent so as to be rounded.

82. The image formation apparatus according to claim 74, wherein an impulsive sound reduction unit for reducing the impulsive sound is provided in order to satisfy any one of the conditions (f) and (h).

83. The image formation apparatus according to claim 82, wherein the impulsive sound reduction unit comprises a paper feed transport control unit which controls the operation of an electromagnetic clutch provided respectively in the paper feed transport passage having a plurality of paper feed stages such that an electromagnetic clutch on the upper stage than the paper feed stage to be used is operated.

84. An image formation apparatus in which the discomfort index S of the sound obtained by the following tone quality evaluation equation (g) expressed in a regression equation, using the regression coefficients of sound pressure level, and loudness value, sharpness value, tonality value and

impulsiveness value of the psychoacoustic parameters obtained from the operating noise at a position away from the end face of the image formation apparatus by a predetermined distance, and ppm (number of printed sheets of paper per minute of A4 lateral size) value:

$$S = G \times (\text{sound pressure level}) + A \times (\text{loudness value}) + B \times (\text{sharpness value}) + C \times (\text{tonality value}) + D \times (\text{impulsiveness value}) + F \times (\text{ppm value}) + E$$

$$G = +0.0636$$

$$A = +0.1178$$

$$B = +0.4356$$

$$C = +3.3075$$

$$D = +0.1373$$

$$F = -0.0026$$

$$E = -5.7022 \quad \ldots (g)$$

satisfies the condition of:

$$S \leq 0.5432 \times \text{Ln (ppm)} - 2.3398$$

$$16 \leq \text{ppm} \leq 70 \quad \ldots (f).$$

85. The image formation apparatus according to claim 84, wherein the discomfort index S satisfies the condition of:

$$S \leq 0.416 \text{ Ln (ppm)} - 2.0952 \quad \ldots (h)$$

$$16 \leq \text{ppm} \leq 70$$

86. The image formation apparatus according to claim 84, wherein with respect to the noise emitted from the image formation apparatus, the discomfort index S of noise in the direction of the operating section at a distance of 1.00m ± 0.03mm from the end face of the image formation apparatus, and at a height of 1.50 ± 0.03m above the floor level or at a height of 1.20 ± 0.03m above the floor level, is within the tolerance.

87. The image formation apparatus according to claim 84, wherein with respect to the noise emitted from the image formation apparatus, the discomfort index S calculated from a mean value of physical quantity of noise in four directions of front and back, and right and left, at a distance of 1.00m ± 0.03mm from the end face of the image formation apparatus, and at a height of 1.50 ± 0.03m above the floor level or at a height of 1.20 ± 0.03m above the floor level, is within the tolerance.

88. The image formation apparatus according to claim 84, wherein with respect to the noise emitted from the image formation apparatus, the discomfort index S of at least one side, at a distance of 1.00m ± 0.03mm from the end face of the image formation apparatus, and at a height of 1.50 ± 0.03m above the floor level or at a height of 1.20 ± 0.03m above

the floor level, is within the tolerance.

89. The image formation apparatus according to claim 84, wherein with respect to the noise emitted from the image formation apparatus, the discomfort index S of noise of all the four sides, at a distance of 1.00m ± 0.03mm from the end face of the image formation apparatus, and at a height of 1.50 ± 0.03m above the floor level or at a height of 1.20 ± 0.03m above the floor level, is within the tolerance.

90. The image formation apparatus according to claim 85, wherein a high-frequency component reduction unit which reduces the high-frequency components is provided, in order to satisfy any of the conditions (f) and (h).

91. The image formation apparatus according to claim 90, wherein the high-frequency component reduction unit has a configuration for reducing the sliding noise of a recording medium in a paper feed transport unit.

92. The image formation apparatus according to claim 91, wherein the high-frequency component reduction unit is a guide member which guides the recording medium, the guide member is formed of a flexible sheet, and the end portion of the flexible sheet which is brought into contact with the recording medium

is curved so as not to have an edge, or bent so as to be rounded.

93. The image formation apparatus according to claim 85, wherein an impulsive sound reduction unit for reducing the impulsive sound is provided in order to satisfy any one of the conditions (f) and (h).

94. The image formation apparatus according to claim 93, wherein the impulsive sound reduction unit comprises a paper feed transport control unit which controls the operation of an electromagnetic clutch provided respectively in the paper feed transport passage having a plurality of paper feed stages such that an electromagnetic clutch on the upper stage than the paper feed stage to be used is operated.

95. A tone quality improving method of an image formation apparatus comprising:

deriving a tone quality evaluation equation capable of evaluating uncomfortable noise emitted from the image formation apparatus, by using the loudness value, sharpness value, tonality value and impulsiveness value, being psychoacoustic parameters; and

decreasing the discomfort index obtained by the equation to a certain value, by reducing the noise having the correlation with a particular psychoacoustic parameter of the

psychoacoustic parameters.

96. The tone quality improving method of an image formation apparatus according to claim 95, wherein sliding noise at the time of carrying the paper, which has the correlation with the sharpness value and the loudness value, is decreased.

97. The tone quality improving method of an image formation apparatus according to claim 95, wherein the charging noise of an image carrier having the correlation with the tonality value is decreased.

98. The tone quality improving method of an image formation apparatus according to claim 95, wherein the noise of the electromagnetic clutch of the paper feed unit having the correlation with the impulsiveness value, loudness value and sharpness value is decreased.